PUBLIC NOTICE

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INTERNATIONAL BUREAU SEEKS COMMENT ON IMPLEMENTING EARTH STATION SITING METHODOLOGIES

IB Docket No. 17-172

Comment Date: July 21, 2017
Reply Comment Date: August 7, 2017

In July 2016, the Commission adopted a Report and Order providing a framework for the provision of mobile operations in certain spectrum bands above 24 GHz.[1] The Commission created a new service, the Upper Microwave Flexible Use Service (UMFUS), and established rules to allow UMFUS licensees to provide any form of fixed or mobile service. Among other things, these rules include a new section 25.136, which specifies the conditions under which Fixed-Satellite Service (FSS) earth stations in the 27.5-28.35 GHz (28 GHz band) and 37.5-40 GHz bands can operate with respect to the UMFUS.[2]

In the 28 GHz band, the Commission adopted county-sized geographic area licenses for the UMFUS. FSS operators will be secondary to UMFUS, but will not be required to provide additional interference protection to UMFUS in specific situations described in section 25.136(a) of the Commission's rules.[3] The rules permit up to three FSS earth stations that do not have to provide interference protection to UMFUS stations to be licensed in each county as long as the interference zones around those stations do not, in the aggregate, cover more than 0.1 percent of the population of the county. The Commission also identified the need to further refine aspects of FSS earth station siting requirements. In this regard, the Commission directed the International Bureau to issue a public notice seeking comment on:

> [T]he appropriate methodology to calculate the 0.1 percent population limit and further details regarding earth station interference zone calculation (including propagation models, *e.g.* free space versus probabilistic), and … on best practices for earth station siting to minimize the impact on UMFU services, colocation of earth stations, and accommodating multiple earth

[1] *Use of the Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, FCC 16-89, 31 FCC Rcd 8014 (2016) (*Spectrum Frontiers Report and Order*).

[2] *Id.* at 8200-02, and Appendix A, section 25.136.

[3] *Id*.

> station interference zones without exceeding 0.1 percent of population in a given county.[4]

The Commission also adopted rules to provide for mobile operations in the 37.5-40.0 GHz band, and adopted partial economic areas (PEAs) as the UMFUS geographic licensing area. FSS earth stations in this band will be entitled to protection from terrestrial stations subject to certain conditions, set forth in sections 25.136(b) and (c).[5] Up to three earth stations protected from UMFUS interference are permitted in each PEA, as long as the protection zones around those earth stations do not, in the aggregate, cover more than 0.1 percent of the population of the PEA. Earth station applicants must describe the zone in which they require interference protection when applying for a license. To implement the conditions in this rule, the Commission directed the International Bureau to release a public notice seeking comment on:

> [T]he appropriate methodology to calculate the 0.1 percent population limit and … on best practices for earth station siting to minimize the impact on UMFU services, colocation of earth stations, and accommodating multiple earth station interference zones without exceeding 0.1 percent of population in a given PEA.[6]

We note that there are petitions for reconsideration of the *Spectrum Frontiers Report and Order* pending, including requests for revisions to the population threshold set forth in section 25.136.[7] This Public Notice does not address those issues, but rather seeks comment on the methodology for determining interference or protection zones, which is relevant regardless of any action the Commission takes on the petitions for reconsideration. Accordingly, the International Bureau seeks comment on the following:

A. Section 25.136(a) – The 28 GHz Band

1. Earth Station Location and Antenna Pointing

> Defining the power flux density (PFD) contour such that it takes into account any possible antenna pointing and does not exceed the aggregate 0.1 percent population threshold would maximize the flexibility afforded to earth station applicants while not affecting UMFUS operators more than permitted under section 25.136. We seek comment on this approach, which would allow earth station applications to include the possibility of transmissions to a space station located at different locations.

[4] *Id.*, at para. 54 & n.120.

[5] *Id.*, Appendix A, sections 25.136(b) and (c).

[6] *Id.*, at para. 93 & n.223.

[7] *See e.g.*, Joint Petition for Reconsideration of EchoStar Satellite Operating Corporation, Hughes Network Systems, LLC, and Inmarsat, filed Dec. 14, 2016; Petition for Reconsideration of SES Americom, Inc. and O3B Limited, filed Dec. 14, 2016; and Petition for Reconsideration of the Satellite Industry Association, filed Dec. 14, 2016.

2. Computing Contours

a. An FSS applicant must demonstrate in its license application that the zone around its earth station, where FSS licensees generate a PFD at 10 meters above ground level, of greater than or equal to -77.6 dBm/m^2/MHz, together with the similar area of any preexisting earth stations located in the same county will, in the aggregate, cover no more than 0.1 percent of the population of the county license area where the earth station is located. To compute the PFD contour, a propagation model should be used. Any suggested model should be valid for the frequency range of interest for the environment) in which the earth station would be located. We seek comment on what propagation models exist that would be appropriate to compute the required PFD contour? Have any of these propagation models been independently validated?

b. How should applicants compute the PFD contour? For example, should the off-axis antenna gain mask in section 25.209 be used to compute the PFD contour?[8] If use of the section 25.209 mask is prescribed, should the applicant be allowed to demonstrate that the PFD contour is smaller than that computed using this mask if it is computed using measured or simulated antenna gain patterns? If we allow the applicant to use measured antenna gain patterns, how should the antenna gain pattern be measured to ensure accuracy at the off-axis angles at which UMFUS stations could be located? If we allow the applicant to use simulated antenna gain patterns, how should the antenna gain pattern simulation be validated? Should near-field effects also be considered in the PFD contour determination? If so, how should the near-field effects be determined?

c. We seek comment on requiring applicants to take into account terrain existing at the time the contour is computed. Should clutter existing at the time the contour is computed also be taken into account, rather than using a general propagation model?[9] Should the applicant be allowed to take shielding into account, provided that the applicant commits to install such shielding and its certification that the facility as authorized has been completed includes certification that the shielding has been installed?[10]

3. Determining Population Percentages in the 28 GHz Band

Section 25.136(a)(4)(ii) provides that the FSS earth station(s) may not cover, in the aggregate of the PFD contour, more than 0.1 percent of the population of the county within which the earth station is located. We seek comment on the methodology used to calculate the 0.1 percent of the county population within a given PFD contour.

a. To what level of detail (zip code, census tract, census block, etc.) should the population in the part of the county covered by the PFD contour be determined?

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[8] *See Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, FCC 16-170, at para. 30 (Dec. 15, 2016) inviting comment on adopting e.i.r.p. density limits for earth station transmissions to NGSO FSS space stations.

[9] Examples of clutter include permanent man-made structures and vegetation, which may cause attenuation of radiofrequency signals.

[10] *See* 47 CFR § 25.133(b)(1).

b. Should the Commission require a specific calculation method such as the "centroid method" or the "actual area method" to be used in calculating the population within the -77.6 dBm/m^2/MHz PFD contour?[11] We seek comment on whether to require earth station applicants to use the most recent measured census data available from the U.S. Census Bureau at the time it submits its application. .

c. We ask commenters to identify practices we can establish for earth station siting that would minimize the impact on UMFU services, promote colocation of earth stations, and accommodate multiple earth station interference zones without exceeding 0.1 percent of population in a given county. In processing an application for an earth station in a given county, are there any processing guidelines we should establish to maximize the opportunity for additional earth stations in that county while minimizing the impact on UMFU operations?

d. If the PFD contour overlaps more than one county, we propose that the percentage of population in each county that falls within the interference zone of the earth station be accounted for within the 0.1 percent aggregate associated with each county. We seek comment on this approach and any alternatives.

B. Sections 25.136(b) and (c) – The 37.5-40.0 GHz Band

In the Report and Order, the Commission adopted rules to protect a limited number of earth stations from interference generated by terrestrial transmissions.[12] We seek comment on the methodology to implement these rules.

1. Earth Station Location and Antenna Pointing

Defining a protection zone such that it takes into account any possible antenna pointing and does not exceed the aggregate 0.1 percent population threshold would maximize the flexibility afforded to earth station applicants while not restricting UMFUS operators more than permitted under section 25.136. We seek comment on this approach, which would allow earth station applications to include the possibility of reception from a space station located at different locations.

2. Computing Protection Zones

a. An FSS applicant must demonstrate in its license application that the protection zone around its earth station is necessary to protect its proposed earth station using reasonable engineering

[11] Under the "centroid method," if the geographic center of a census geographic area falls within a PFD contour, the entire population of that census geographic area would be counted. Under the "actual area method," the fraction of the population within the census geographic area corresponding to ratio of the census geographic area lying within the PFD contour to the total area of the census geographic area would be counted. *See also,* Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993 Annual report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services, *Nineteenth Report,* 31 FCC Rcd 10534, paras. 34-36 (2016).

[12] *Spectrum Frontiers Report and Order*, Appendix A, sections 25.136(b) and (c).

methods. The FSS applicant must also demonstrate that the protection zone around its earth stations, together with the protection zones of any preexisting earth stations located in the same PEA will, in the aggregate, cover no more than 0.1 percent of the population of the PEA where the earth station is located. How should the Commission evaluate the reasonableness of the protection criteria the applicant uses in its computation of the protection zone? To compute the protection zone, a propagation model should be used. Any suggested propagation model should be valid for the frequency range of interest for the environment in which the earth station would be located. We seek comment on what propagation models exist that would be appropriate to compute the required protection zone? Have any of these propagation models been independently validated?

b. How should applicants compute the protection zone? For example, should the off-axis antenna gain mask in section 25.209 be used to compute the protection zone, or should an alternative method be used?[13] If the use of the section 25.209 mask is prescribed, should the applicant be allowed to demonstrate that the protection zone is smaller than that computed using this mask if it is computed using measured or simulated antenna gain patterns? If we allow the applicant to use measured antenna gain patterns, how should the antenna gain pattern be measured to ensure accuracy at the off-axis angles at which UMFUS stations could be located? If we allow the applicant to use simulated antenna gain patterns, how should the antenna gain pattern simulation be validated? Should near-field effects also be considered in the protection zone determination? If so, how should the near-field effects be determined?

c. We seek comment on whether to require applicants to take into account terrain existing at the time the protection zone is computed. Should clutter existing at the time the contour is computed be taken into account, rather than using a general propagation model? Should the applicant be allowed to take shielding into account, provided that the applicant commits to install such shielding and its certification that the facility is authorized has been completed includes certification that the shielding has been installed?[14]

3. Determining Population Percentages in the 37.5-40.0 GHz Band

Under section 25.136(b), an FSS earth station can claim protection from UMFUS transmissions within a specified zone, and UMFUS licensees may not locate facilities within the zone without the consent of the earth station operator. Section 25.136(c) provides that up to three earth stations entitled to protection may be located within any PEA, creating up to three protection zones. These protection zones may not cover, in the aggregate more than 0.1 percent of the population of the PEA within which the earth station is located. We seek comment on the methodology to be used to calculate the percentage of the PEA population within a given protection zone.

a. To what level of detail (zip code, census tract, census block, etc.) should the population in the part of the PEA covered by the protection zone be determined?

b. Should the Commission require a specific calculation method such as the “centroid method” or the “actual area method” to be used in calculating the population within the protection

[13] *See* footnote 7, *supra*.

[14] 47 CFR § 25.133(b)(1).

zone(s)? We seek comment on requiring earth station applicants to use the most recent measured census data available from the U.S. Census Bureau at the time it submits its application.

c. We ask commenters to identify practices we can establish for earth station siting that would minimize the impact on UMFU services, promote colocation of earth stations, and accommodate multiple earth station protection zones without exceeding 0.1 percent of population in a given PEA? In processing an application for an earth station in a given PEA, are there any processing guidelines we should establish to maximize the opportunity for additional earth stations in that county while minimizing the impact on UMFU operations?

d. If a protection zone overlaps more than one PEA, how should the percentage of the population be computed for each PEA -based on the population overlap in that PEA- or some other criterion?

We seek comment on the above, and any other factors to consider in authorizing FSS service in the 28 GHz and 37.5-40 GHz bands pursuant to section 25.136 of the Commission's rules. We invite commenters to identify any issues that would assist with implementing the rule. To the extent that commenters believe we should include certain analyses or methodologies, we ask that recommendations be supported with specific relevant data and/or technical showings.

Comment Filing Procedures

Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments on or before **July 21, 2017,** and reply comments on or before **August 7, 2017**. All filings must refer to **IB Docket No. 17-172**. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://apps.fcc.gov/ecfs/.

- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

In addition, provide one copy of each filing to Chip Fleming, Office of the Division Chief, Satellite Division, International Bureau, Chip.Fleming@fcc.gov.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

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Ex Parte Presentations

This is a "permit-but-disclose" proceeding, subject to the Commission's ex parte rules. Persons making ex parte presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation. Persons making oral ex parte presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the ex parte presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during ex parte meetings are deemed to be written ex parte presentations and must be filed consistent with rule 1.1206(b), 47 CFR § 1.1206(b).

For further information please contact Chip Fleming at (202) 418-1247 or Chip.Fleming@fcc.gov.

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